Environmental Resources Management, inc.
855 Springdale Drive • Exton, Pennsylvania 19341 • (215) 524-3500

Letter of Transmittal

DATE 1/25/89 W.O. No. 802-01-03-01
ATTENTION
RE:

SDMS Document
67646

TO Janet Feldstein (5-enc.)
Pat Sheridan (1-enc)
Pam Lange (3-enc.)

GENTLEMEN:

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via ____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☑ Final Sampling Plan - SCP/Carlstadt

COPIES	DATE	NO.	DESCRIPTION

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval
☑ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☐ For review and comment ☐ ____
☐ FOR BIDS DUE ____ 19 ____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS
Janet, Pat -
Enclosed are 5 copy of the final sampling plan dated 1/25/89. Resolution of EPA's comments to the sampling plan (rec'd 1/13/89, 1/18/89 and 1/23/89) are included along with comments made in our meeting with Paul Schultz at ERM's office today. This is the version which our sampling crew will use in the field. Ebasco will be given 3 copies at the site the day of sampling. This version supercedes the draft sampling plan and all associated tables. Call if you have any comments/questions. Thank you,

COPY TO R Fender P Schultz (enc)
G. Weil (enc) B Warren (enc)
E. Sullivan (7enc)
F. Holmes (enc)

SIGNED: Marian E DiCarlo

If enclosures are not as noted, kindly notify us at once.

000841

SAMPLING PLAN FOR TREATABILITY WORK

SCP/CARLSTADT SITE
FEASIBILITY STUDY/FIRST OPERABLE UNIT

24 January 1989

Prepared For:

SCP/Carlstadt PRP Committee
Carlstadt, New Jersey

Prepared By:

Environmental Resources Management, Inc.
855 Springdale Drive
Exton, Pennsylvania 19341

FILE: 802-01-03-01

00084

The ERM Group

SAMPLING PLAN FOR TREATABILITY WORK
SCP/CARLSTADT SITE

1.0 Purpose of Site Sampling

This Sampling Plan addresses the collection of soil, sludge, and shallow aquifer ground water for treatability studies to be performed on these media. These treatability studies will be conducted as a distinct task of the Feasibility Study/First Operable Unit (FS/FOU), being conducted for the SCP/Carlstadt site in Carlstadt, New Jersey.

Treatability studies are to be conducted on three remediation technologies potentially applicable to the soil and sludges of the FOU. They are thermal treatment, extraction, and solidification/stabilization. The thermal treatability study and the extraction treatability study will be conducted by one contractor each. The solidification/stabilization treatability studies will be performed by two contractors. If treatability contractors can complete the desired scope of work, within the timeframe of the FS/FOU development and submittal, water treatment technologies will be evaluated for the FOU. They may include granular activated carbon, steam stripping, critical-fluid extraction, and ultraviolet (UV) light/peroxidation.

These treatability studies will be performed to help assess the practicality, performance, and cost of various source-control remedial technologies.

2.0 Preparations Prior to Sampling

2.1 Equipment for Sampling

The equipment which will be prepared for use in sampling and compositing soils and sludges includes stainless steel hand bucket augers, steel shovels, stainless steel hand tools, and steel mixing containers. The equipment which will be prepared for use in sampling ground water from the shallow aquifer includes an electronic water level indicator, measuring tape, Fultz stainless steel and teflon pump(s), and 55-gallon steel drums.

2.2 Site Access

The site is accessible via a locked gate in the security fence surrounding the site. Permission and arrangements for site access must be made via notification to the PRP Group Technical Committee, a Dames and Moore Site Representative, and EPA Region II.

2.3 Arrangements with Treatability Contractors

The specific treatment technologies and the treatability contractors who most likely will perform each study are listed in Table 1. Also, the addresses of these contractors are provided in Table 1.

TABLE 1

CONTRACTORS FOR TREATABILITY WORK

Thermal Treatment:	EER 8001 Irvine Rd. Santa Ana, CA 92706
Extraction:	ERM, Inc. 855 Springdale Drive Exton, PA 19341
Solidification/ Stabilization:	Hazcon, Inc. 32522 McAllister Rd. Brookshire, TX 77423
	Enreco, Inc. Enreco Laboratories 6661-A Canyon Expressway Amarillo, Tx 79110
Granular Activated Carbon:	Calgon Corp. Technical Services Dept. Bldg. 3, Rt. 60 Robinson Twp., PA 15205
Steam Stripping:	APV Crepaco Inc. * 395 Fillmore Avenue Tonawanda, NY 14150
Critical Fluid Extraction:	CF Systems 46 Acorn Park Cambridge, MA 02140
Chemical Oxidation:	Peroxidation Systems, Inc. 3450 S. Broadmont Suite 104 Tuscon, AZ 85713

* Probable contractor to conduct steam stripping

3.0 Soil Sample Locations and Volume

After a review of the available data, as provided in the Dames and Moore Remedial Investigation (RI) Report on site soil contamination, sampling locations have been selected to provide representative soil and sludge samples for the treatability studies. Table 2 provides the data on site soil and sludge, which are given in the Dames and Moore RI Report. The data were evaluated to select the sampling locations for this Plan. The sampling locations are presented in Table 3.

Table 3 indicates the sampling locations for the 6 soils and 2 sludge samples, the depths selected for each sampling location, the number of portions making up a sample, the metals/compounds for study, and the reasons for selection of the locations. Table 4 provides the total volume of each distinct soil sample and sludge sample to be collected, and the corresponding sampling locations and sampling depths. Table 5 presents a summary of the sample types, sampling locations and sample volumes to be collected for each treatability study contractor.

Soil samples shall be collected as close as possible to the identified sampling locations specified in this Sampling Plan. Sampling locations are shown in Figure 1. Sampling is to take place within a 10-foot radius of each sampling location. When more than one grab sample is taken from within a particular 10 foot radius, the grab samples will be composited to produce a single sample to represent that sampling location.

TABLE 2

DAMES AND MOORE RI DATA
Soil and Sludge Analyses for SCP/Carlstadt Site, mg/kg

Sampling Location	Depth (ft)	VOCs	PHCs	B/N	Aroclor 1242	Aroclor 1254
B-1	0 to 2	12166	81600	447	15000	-
	5 to 6	6501	27500	277.1	210	-
	Top of clay	7.288	440	7.202	4.6	-
B-2	0 to 2	4347	13700	130.723	-	-
	5 to 6	3394	10400	130.4	8.9	-
	Top of clay	31.56	1010	4.373	1.6	-
B-3	0 to 2	109.99	4650	374.85	2.2	-
	5 to 6	8418	13600	160.6	1.6	2.4
	Top of clay	16.747	5780	4.268	0.032	-
B-4	0 to 2	986.9	430	113.253	2.2	-
	5 to 6	12.7	1270	2.7	-	-
	Top of clay	-	51	1.73	-	-
B-5	0 to 2	449.8	7410	48.97	20	-
	5 to 6	2051	10900	61	-	-
	Top of clay	15.254	130	42.47	-	-
B-6	0 to 2	1.02	680	38.43	-	-
	5 to 6	63.5	29600	152.5	-	-
	Top of clay	0.276	61	12.14	-	-
P-1	0 to 2	0.616	4160	121.49	1.2	-
	5 to 6	28.7	360	1.2	0.085	-
	Top of clay	-	<34	4.838	-	-
P-2	0 to 2	231.7	2600	177.25	96	-
	5 to 6	311.7	278	10	5.2	3.5
	Top of clay	183.45	<29	0.93	0.04	-
P-3	0 to 2	0.079	2680	47.676	-	-
	5 to 6	85.1	1080	41.5	-	-
	Top of clay	2.172	3780	38.511	2.8	2.2
P-4	0 to 2	0.024	679	23.165	0.33	-
	5 to 6	0.8	950	26.1	0.58	-
	Top of clay	1822	823	174.343	2.1	-
MW-1S	0 to 2	0.027	605	42.663	-	4.1
	5 to 6	-	36	4.2	-	0.18
	Top of clay	0.0421	191	2.39	-	-
MW-3S	0 to 2	7.354	11800	170.046	160	-
	5 to 6	2101	16500	3912.8	290	-
	Top of clay	65.81	126	6.865	5.4	-
MW-4S	0 to 2	1.356	290	304.357	5.4	-
	5 to 6	237.3	14000	227.8	1.4	-
	Top of clay	0.0614	4650	4.887	0.017	-
MW-6S	0 to 2	7993	5010	55.2	4.4	-
	5 to 6	0.3	390	7.1	1.5	-
	Top of clay	28.53	120	6.19	0.039	-
MW-2D	0 to 2	99.513	7680	46.121	39	7.4
	5 to 6	0.6	8290	430.3	350	-
	Top of clay	2.145	61	0.999	-	-
MW-5D	0 to 2	2.608	18000	145.582	-	7.5
	5 to 6	11	1110	-	0.08	-
	Top of clay	0.355	80	1.18	0.18	0.064
MW-7D	0 to 2	0.476	1870	38.59	-	12
	5 to 6	9889	8360	41	23	-
	Top of clay	34.942	154	5.35	0.76	-

- indicates not detected

TABLE 2 (Cont'd)
(All values in mg/kg)

Sampling Location	Depth (ft)	Aroclor 1248	Aroclor 1260	Arsenic	Beryllium	Cadmium
B-1	0 to 2	-	-	15	0.35	95.1
	5 to 6	-	-	8.8	0.23	25
	Top of clay	-	-	14	0.43	132
B-2	0 to 2	23	9.9	2.7	0.82	36.9
	5 to 6	-	10	-	0.49	26
	Top of clay	-	1	4.3	0.74	3.3
B-3	0 to 2	-	-	5.4	0.66	58.2
	5 to 6	-	-	5.6	0.4	22
	Top of clay	-	-	2.5	0.41	0.97
B-4	0 to 2	-	-	9.5	0.78	1.9
	5 to 6	-	-	3	0.75	0.32
	Top of clay	-	-	1.6	0.41	-
B-5	0 to 2	-	-	60	0.41	5.4
	5 to 6	9.7	-	20	0.39	21
	Top of clay	2.6	-	-	0.45	2.2
B-6	0 to 2	-	-	26	0.66	69
	5 to 6	7.6	-	9.3	0.32	17
	Top of clay	0.26	-	-	0.39	1.4
P-1	0 to 2	-	-	22	0.4	1.6
	5 to 6	-	-	1.2	1.3	-
	Top of clay	-	-	1.1	0.3	-
P-2	0 to 2	-	-	10	0.23	6.5
	5 to 6	-	-	7.5	0.3	8.5
	Top of clay	-	-	4.2	0.49	-
P-3	0 to 2	-	-	5.7	0.4	9.5
	5 to 6	-	-	29	0.9	4.5
	Top of clay	-	-	18	0.5	26
P-4	0 to 2	-	-	3.8	0.42	1
	5 to 6	-	-	3.5	0.37	1.8
	Top of clay	-	-	3.5	0.67	0.52
MW-1S	0 to 2	4.1	-	11	0.36	1.3
	5 to 6	-	-	1.2	0.4	0.46
	Top of clay	-	-	-	0.36	-
MW-3S	0 to 2	-	-	-	0.31	12
	5 to 6	-	-	-	0.42	11
	Top of clay	-	-	4	0.66	-
MW-4S	0 to 2	-	-	3.8	0.42	1.7
	5 to 6	-	-	62	0.44	6.6
	Top of clay	-	-	3.4	0.55	-
MW-6S	0 to 2	-	-	13	0.44	16
	5 to 6	-	-	19	0.77	0.74
	Top of clay	-	-	-	0.61	-
MW-2D	0 to 2	-	-	7.7	0.35	2.6
	5 to 6	-	-	8.9	0.37	9
	Top of clay	-	-	-	0.41	-
MW-5D	0 to 2	15	48	-	57.6	2.9
	5 to 6	-	2.1	9.6	0.76	0.48
	Top of clay	-	0.043	-	0.66	0.56
MW-7D	0 to 2	12	-	-	0.87	5.5
	5 to 6	-	-	51	0.58	6.9
	Top of clay	-	-	-	0.46	1.1

- indicates not detected

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TABLE 2 (Cont'd)
(All values in mg/kg)

Sampling Location	Depth (ft)	Silver	Selenium	Zinc	Mercury
B - 1	0 to 2	19	1	4170	4.70
	5 to 6	40	-	1110	3.50
	Top of clay	1.2	1.3	140	0.36
B - 2	0 to 2	1.2	4.9	295	11.8
	5 to 6	-	2.1	761	13.6
	Top of clay	-		140	0.44
B - 3	0 to 2	-	3.5	292	1
	5 to 6	-		517	1.3
	Top of clay	-		43	-
B - 4	0 to 2	-		150	0.41
	5 to 6	-		67	0.78
	Top of clay	-		29	-
B - 5	0 to 2	6.4		440	0.64
	5 to 6	-		1050	2.7
	Top of clay	-		100	0.63
B - 6	0 to 2	3.9		667	21.3
	5 to 6	-		1870	1.4
	Top of clay	-		231	0.41
P - 1	0 to 2	1.6		227	1.1
	5 to 6	-		46	0.25
	Top of clay	-		22	-
P - 2	0 to 2	-		180	1
	5 to 6	-		350	0.42
	Top of clay	-		56	-
P - 3	0 to 2			442	1.7
	5 to 6		1	1400	0.14
	Top of clay			44400	13.6
P - 4	0 to 2	-		349	0.83
	5 to 6	-		411	0.62
	Top of clay	-		120	-
MW-1S	0 to 2	1.3		637	0.49
	5 to 6	-		83	1.6
	Top of clay	-		26	0.084
MW-3S	0 to 2	-		542	1.7
	5 to 6	-		485	0.77
	Top of clay	-		69	-
MW-4S	0 to 2	-		229	1.1
	5 to 6	-	1.6	130	-
	Top of clay	-		53	-
MW-6S	0 to 2	-	1.2	715	6.3
	5 to 6	-		170	3.4
	Top of clay	-		45	0.25
MW-2D	0 to 2	-		130	0.4
	5 to 6	-		376	0.52
	Top of clay	-		47	-
MW-5D	0 to 2	-		418	0.72
	5 to 6	-		79	0.14
	Top of clay	-		78	0.2
MW-7D	0 to 2	-	0.88	713	0.55
	5 to 6	-		683	0.35
	Top of clay	-		45	0.35

- indicates not detected

TABLE 2 (Cont'd)
(All values in mg/kg)

Sampling Location	Depth (ft)	Chromium	Copper	Nickel	Lead	Antimony
B-1	0 to 2	721	15800	39	2750	16
	5 to 6	542	8600	46	2110	-
	Top of clay	39	11900	13	170	-
B-2	0 to 2	211	840	37	1080	11
	5 to 6	120	425	27	891	-
	Top of clay	27	45	23	53	-
B-3	0 to 2	73	484	23	410	-
	5 to 6	80	158	19	620	6.9
	Top of clay	21	13	11	43	1
B-4	0 to 2	47	3240	19	180	-
	5 to 6	21	218	21	34	-
	Top of clay	14	11	11	-	-
B-5	0 to 2	57	71600	-	470	-
	5 to 6	166	284	27	1340	38
	Top of clay	28	225	12	180	-
B-6	0 to 2	140	19300	-	880	-
	5 to 6	60	4880	11	1680	8
	Top of clay	19	290	10	120	-
P-1	0 to 2	19	10800	12	420	-
	5 to 6	22	88	17	18	-
	Top of clay	12	28	5.8	-	-
P-2	0 to 2	79	460	13	300	-
	5 to 6	51	163	40	290	-
	Top of clay	16	27	20	10	-
P-3	0 to 2	870	645	19	872	-
	5 to 6	43	884	50	2810	-
	Top of clay	56	448	44	916	29
P-4	0 to 2	59	315	10	620	-
	5 to 6	19	522	11	610	7.6
	Top of clay	19	37	21	26	-
MW-1S	0 to 2	27	16500	19	290	-
	5 to 6	12	806	8.5	45	-
	Top of clay	13	59	6.4	9	-
MW-3S	0 to 2	100	979	33	400	-
	5 to 6	255	561	16	1490	-
	Top of clay	24	28	23	31	-
MW-4S	0 to 2	79	1670	14	140	-
	5 to 6	61	747	116	87	-
	Top of clay	16	39	18	8.6	-
MW-6S	0 to 2	244	2980	28	782	-
	5 to 6	66	85	24	110	-
	Top of clay	21	17	9.9	12	-
MW-2D	0 to 2	38	1970	14	140	-
	5 to 6	28	5670	25	230	-
	Top of clay	13	47	17	10	-
MW-5D	0 to 2	98	399	12	959	5.9
	5 to 6	26	32	27	20	-
	Top of clay	19	31	22	32	-
MW-7D	0 to 2	39	1420	24	648	
	5 to 6	72	100	46	100	-
	Top of clay	17	120	7.9	40	-

- indicates not detected

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TABLE 3

SELECTION OF SOIL AND SLUDGE SAMPLES' LOCATIONS

Soil Sample	Sampling Location	Sampling Depth (feet)	*Number of* Portions Making Up the Sample	Metals/Compounds for Study	Reason for Selection
Hot Spot Soil Composite - Metals Only	B-1	0 to 2	6	Ag, Cr, Ni, Pb, Zn, Cd	Selected to provide material containing the highest detected concentration of these metals
	B-2	0 to 6	2	Se, Hg	Selected to provide material containing the highest detected concentration of these metals
	B-5	0 to 6	3	Sb, Cu, As	Selected to provide material containing the highest detected concentration of these metals
	MW-5D	0 to 2	1	Be	Selected to provide material containing the highest detected concentration of these metals
Overall Soil Composite - All Parameters	B-4	0 to 6	1	VOCs, PHCs, PCBs, B/Ns and metals	Contains non-hot spot concentrations of VOCs, PHCs, PCBs, base neutrals, and 9 metals
	P-2	0 to 6	1	VOCs, PHCs, PCBs, B/Ns and metals	Contains non-hot spot concentrations of VOCs, PHCs, PCBs, base neutrals, and 9 metals
	P-3	0 to 6	1	VOCs, PHCs, PCBs, B/Ns, and metals	Contains non-hot spot concentrations of VOCs, PHCs, PCBs, base neutrals, and 8 metals; contains hot spot locations for 3 metals
	P-4	0 to 6	1	PHCs, PCBs, B/Ns, and metals	Contains non-hot spot concentrations of PHCs, PCBs, base neutrals, and 10 metals.
	MW-6S	0 to 6	1	VOCs, PHCs, B/Ns, PCBs, and metals	Contains non-hot spot concentrations of VOCs, PHCs, base neutrals, and 10 metals; contains one hot spot depth for one PCB and one hot spot depth for VOCs.
Soil Hot Spot- Lead Only	P-3	5 to 6	1	Lead	The highest lead concentration (2,810 mg/kg) was detected here.
Soil Hot Spot- PCBs Only (Aroclor 1242)	B-1	0 to 2	1	Aroclor 1242	The highest PCB concentration (15,000 mg/kg) was detected here.

NOTE: **Determination of locations and depths is based on Dames and Moore RI Report.**

TABLE 3 (Cont.d)

Soil Sample	Sampling Location	Sampling Depth (feet)	Number of Portions Making Up Sample	Metals/Compounds For Study	Reason for Selection
Hot Spot Soil Composite-All Parameters	B-1	0 to 2	1	Ag, Cr, Ni, Pb, Zn, Cd VOCs, PHCs, B/N, Aroclor 1242 (a PCB),	Contains hot spots for 6 metals, VOCs, PHCs, B/Ns, and Aroclor 1242; concentrations of these were higher than at any other location and depth
	B-2	0 to 2	1	Aroclor 1248 and 1260, B/N, VOCs, and PHCs	Contains hot spots for 2 PCB compounds; contains relatively high concentrations of B/N, VOCs, and PHCs; concentrations of these were higher than at any other location and depth
	B-3	5 to 6	1	Total VOCs	The highest total VOCs concentration was detected here.
	B-5	0 to 6	1	Sb, Cu, As	Contains hot spots for these 3 metals
	MW-3S	0 to 6	1	VOCs, PHCs, B/N, Arochlor 1242, 9 metals	Contains hot spots for PHCs, Aroclor 1242, B/N, Cr; contains relatively high concentrations of Pb, Cu, and Zn; concentrations of these were higher than at any other location and depth
	MW-3S	5 to 6	1	Base neutrals	The highest total base neutrals concentration (3,912 mg/kg) was detected here.
Soil Hot Spot- VOCs Only	B-3	5 to 6	1	VOCs	The highest total VOCs concentration (9,889 mg/kg) was detected here.
Sludge Sample					
Sludge Hot Spot - B/N Only	B-1	5 to 6	1	B/N	The highest total B/N concentration in the sludge pit area (277 mg/kg) was detected here.
Sludge Tank and Pit Composite	Random locations	a) For pit, 2 to 6	1	All present	Random selection of 4 sample locations from the entire sludge depth and area will produce an appropriate sample.
		b) For tank, from entire sludge volume	1	All present	Random selection of 4 sample locations from the entire sludge depth and area will produce an appropriate sample; random sampling may be restricted due to ease of tank sampling.

NOTE: **Determination of hot spot locations and depths is based on Dames and Moore RI Report.**

TABLE 4

TOTAL VOLUME OF EACH SOIL SAMPLE AND SLUDGE SAMPLE TO BE COLLECTED

Soil Sample	Sampling Location(s)*	Total Volume Needed (gallons)
Hot Spot Soil Composite - Metals	B-1, B-2, B-5, MW-5D	15 gal
Overall Soil Composite	B-4, P-2, P-3, P-4, MW-6S	45 gal
Soil Hot Spot - Lead	P-3	45 gal
Soil Hot Spot - PCBs	B-1	15 gal
Hot Spot Soil Composite	B-1, B-2, B-3, B-5, MW-3S	45 gal
Soil Hot Spot - VOCs	B-3	30 gal
Sludge Sample		
Sludge Hot Spot - B/N	B-1	45 gal
Sludge Tank and Pit Composite	Random locations: 4 for the tank and 4 for the pit	60 gal

* See Table 3 for sampling depths determined for each sampling location(s) for the various soil samples and sludge sample.

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TABLE 5

SUMMARY OF SOILS AND SLUDGE SAMPLING
FS/FOU SAMPLING PLAN

SOIL SAMPLES :

Treatment Technology	Treatability Contractor	Soil Sample	SAMPLING LOCATIONS *											Volume to be Collected (gallons)
Thermal Treatment	EER	Hot Spot Soil Composite- Metals	B-1	B-2			B-5				MW-5D			15
Contaminant Extraction	ERM, Inc.	Soil Hot Spot - Lead							P-3					15
		Soil Hot Spot - PCBs (Aroclor 1242)	B-1											15
		Hot Spot Soil Composite- All Parameters	B-1	B-2	B-3		B-5					MW-3S		15
		Overall Soil Composite				B-4		P-2	P-3	P-4			MW-6S	15
Solidification	Hazcon	Soil Hot Spot - Lead							P-3					15
		Soil Hot Spot - VOCs			B-3									15
		Hot Spot Soil Composite- All Parameters	B-1	B-2	B-3		B-5					MW-3S		15
		Overall Soil Composite				B-4		P-2	P-3	P-4			MW-6S	15
Solidification	Enreco	Soil Hot Spot - Lead							P-3					15
		Soil Hot Spot - VOCs			B-3									15
		Hot Spot Soil Composite- All Parameters	B-1	B-2	B-3		B-5					MW-3S		15
		Overall Soil Composite				B-4		P-2	P-3	P-4			MW-6S	15

SLUDGE SAMPLES :

Treatment Technology	Treatability Contractor	Sludge Sample	SAMPLING LOCATIONS *		Volume to be Collected (gallons)
Thermal Treatment	EER	Sludge Tank and Pit Composite		Random points: 4 from the Former Pit area Random points: 4 from the sludge tank	15
Contaminant Extraction	ERM, Inc.	Sludge Hot Spot - B/N	B-1		15
		Sludge Tank and Pit Composite		Random points: 4 from the tank and 4 from the former pit	15
Solidification	Hazcon	Sludge Hot Spot - B/N	B-1		15
		Sludge Tank and Pit Composite		Random points: 4 from the tank and 4 from the former pit	15
	Enreco	Sludge Hot Spot - B/N	B-1		15
		Sludge Tank and Pit Composite		Random points: 4 from the tank and 4 from the former pit	15

* See Table 3 for sampling depths determined for each sampling location(s) for the various soil samples and sludge sample.

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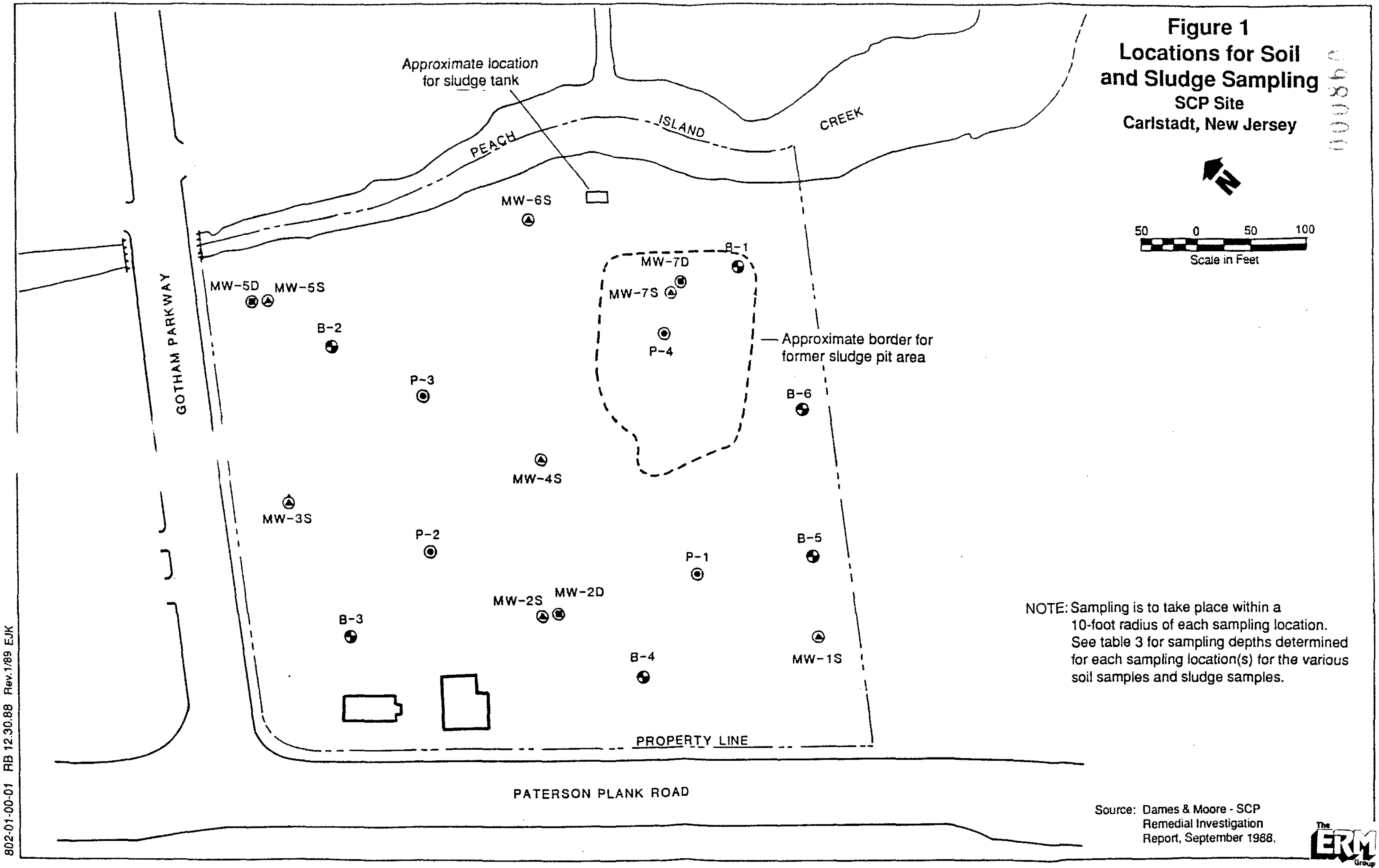
Figure 1
Locations for Soil
and Sludge Sampling
SCP Site
Carlstadt, New Jersey
50 0 50 100
Scale in Feet
Approximate location
for sludge tank
PEACH ISLAND CREEK
GOTHAM PARKWAY
MW-6S
MW-7D
B-1
MW-7S
MW-5D
MW-5S
B-2
P-4
Approximate border for
former sludge pit area
P-3
B-6
MW-4S
MW-3S
P-2
B-5
P-1
MW-2S
MW-2D
B-3
MW-1S
B-4
PROPERTY LINE
PATERSON PLANK ROAD
NOTE: Sampling is to take place within a
10-foot radius of each sampling location.
See table 3 for sampling depths determined
for each sampling location(s) for the various
soil samples and sludge samples.
Source: Dames & Moore - SCP
Remedial Investigation
Report, September 1988.
The ERM Group
802-01-00-01 RB 12.30.88 Rev.1/89 EJK

In response to EPA's request, a grab sample consisting of 2 gallons will be taken on the surface at each of the sampling locations as the following lists:

- one grab sample from B-1
- one grab sample from B-2
- one grab sample from B-3
- one grab sample from B-4
- one grab sample from B-5
- one grab sample from P-2
- one grab sample from P-3
- one grab sample from P-4
- one grab sample from MW-5D
- one grab sample from MW-3S
- one grab sample from MW-6S.

Each grab sample will be sent out separately to CompuChem for EP toxicity analyses for metals.

The address for CompuChem is:

Attention: Nathan Frank
CompuChem Labs
Marketing Department
3308 Chapel Hill/Nelson Highway
Research Triangle Park, North Carolina 27709

3.1 Individual Soil Samples

As Table 3 shows, individual "Hot Spot" grab samples will be taken at locations with the highest known concentrations of metal(s), or organic compounds (Dames and Moore RI Report), anticipated to be the most difficult to remove by extraction procedures and solidification procedures. Lead and PCBs are anticipated to be the most difficult to remove from a soil matrix by extraction, and therefore will be studied for the hot spot samples. Similarly, lead and VOCs are anticipated to be most difficult to immobilize by solidification, and therefore will be studied for the hot spot samples. The highest soil concentrations of lead and PCBs recorded by Dames and Moore are at sampling locations P-3 at a depth of 5 to 6 feet and B-1 at a depth of 0 to 2 feet, respectively. The highest known concentrations of VOCs are at sampling point B-3 at a depth of 5 to 6 feet.

Each 15-gallon sample will be placed into three, 5-gallon plastic sample containers with triple plastic liners (the first liner being polyethylene) for ease of shipment in sample coolers.

3.2 Composite Soil Samples

Tables 3, 4 and 5 provide details concerning sample locations and depths, number of portions for compositing samples and composite soil samples to be prepared from individual grab samples, along with the total volume to be sent to the treatability contractors.

A number of sampling locations will be used to allow the collection of the "Hot Spot Soil Composite - Metals" sample for thermal testing and the "Hot Spot Soil Composite" and "Overall

Soil Composite" samples for the extraction and the solidification contractors. The "Hot Spot Soil Composite - Metals" sample will be a mixture of grab samples from locations containing the highest reported concentrations of metals. The "Hot Spot Soil Composite" sample will be a mixture of grab samples from locations containing the highest reported concentrations of metals and organics. The "Overall Soil Composite" samples will be a mixture of grab samples from random sampling locations on site, excluding the hot spot areas containing the highest reported concentrations(s). The "Overall Soil Composite" sample will be composed of soils obtained from selected sampling locations for which concentrations reported by Dames and Moore were not as high as those locations having the highest concentrations for the site. An "Overall Soil Composite" sample will be composed of soils obtained from selected sampling locations for which concentrations reported by Dames and Moore were not as high as those locations having the highest concentrations for the site. An "Overall Soil Composite" sample will be studied by each contractor, and in this way, treatability will be tested for the areas of lower concentrations at the site.

4.0 Sludge Sample Locations and Volume

The two sources of sludge samples are (1) the tank resting in a roll-off container, and (2) the former pit area. Both are shown in Figure 1. The type, sampling location(s), sampling depth(s), and total volumes of the one individual and one composite sludge sample to be collected for each contractor are provided in Tables 3, 4, and 5. The individual sample is to be labeled "Sludge Hot Spot-B/N" and collected near sampling location B-1. The composite sample is to be labeled "Sludge Tank and Pit

Composite" and composed of grab samples taken from four (4) random locations in the former pit area and four (4) random locations in the sludge tank. Location B-1, at a depth of 5 to 6 feet, was selected since it is the point of highest known total base/neutral compound (B/N) concentration in the sludge pit, based on the RI data. The high concentration of B/N organics in this sludge sample will account for a worst-case scenario for extraction testing.

The random sampling points for the sludge pit will be chosen by ERM on the day of sampling. The depth of sampling will be 2 to 6 feet, allowing samples to be collected below fill soil. The tank sludge samples will be taken from various depths and areas in the tank sludge as feasible, considering the tank's accessibility.

Each extraction contractor and solidification contractor will receive a 15-gallon grab sample of "Sludge Hot Spot--B/N" and a 15-gallon sample of the "Sludge Tank and Pit Composite". The thermal treatment contractor will receive a 15-gallon sample of the "Sludge Tank and Pit Composite" only. Each sample volume will be placed into three 5-gallon sample containers with triple plastic liners (The first liner being polyethylene) for ease of shipment in sample coolers.

5.0 Ground Water Sampling Locations

Ground water samples for treatability testing will be taken from well locations 3S and 7S to obtain a worst-case concentration and contaminant range. These samples will be shipped to the treatability vendors listed in Table 1. Table 6 provides the volumes of ground water to be sent to each contractor. At the

TABLE 6

SAMPLE SHIPPING INFORMATION
GROUND WATER TREATABILITY STUDIES

Treatability Test	Sample Volume, gal.
Steam stripping	2
UV/Peroxidation	10
Activated Carbon	15
Critical-fluid extraction	2

time of sampling, field tests for pH and dissolved oxygen wil be performed. In addition, samples will be collected from these wells for iron, hardness, BOD_5, COD, TOC, TSS, TDS, chloride, alkalinity, and sulfate.

6.0 Sample Collection and Compositing Procedures

6.1 Individual Soil and Sludge Sample Collection

Individual soil and sludge samples (i.e., grab samples) will be collected from the desired depth intervals using either a stainless steel hand bucket auger, a steel shovel, or a backhoe, depending on the ease of sample collection and the freeze-thaw depth in the site subsurface. These grab samples will be placed in 5-gallon plastic containers with triple plastic liners (the first liner being polyethylene) for shipment.

The exact sampling locations will be located within a 10-foot radius of the original Dames & Moore RI sampling location. If the sample cannot be collected due to obstructive objects buried at the sampling location, the sampling location will be relocated nearby within the 10 foot radius, or the ERM Site Operations Manager will employ other mechanical means for collecting the sample from the original location.

6.2 Soil and Sludge Sample Compositing

Compositing of grab samples will take place in a steel container that will be decontaminated between preparations for each composite. The following procedure will be used for compositing.

1. A volume of grab sample from each selected sampling location/depth will be obtained and stockpiled with minimum possible disturbance of the material.

2. Portions of each grab sample will be obtained from the stockpile with a shovel, and split equally among the different contractors. This will be done by using a shovel to place equal volumes of the grab sample into each sample composite container (one composite container per contractor).

3. Each subsequent grab sample will be placed in the composite container, to form sample layers.

4. Each composite container will be filled to the top to minimize headspace.

5. Composite containers will be sealed and shipped directly to the contractor.

6. Each contractor will be instructed to mix the container contents gently to minimize loss of volatiles, and just sufficiently to composite the layers in the container. Each contractor will send a portion of incoming sample to an independent lab for raw waste characterization. The remaining sample will be tested by the contractor's treatability method.

This procedure will minimize the loss of volatiles as much as possible, and produce composite samples which are close to representing site conditions, although not completely homogenized.

A similar compositing procedure will be used to prepare the Overall Soil Composite and the Hot Spot Soil Composite for the extraction contractor and the two solidification contactors.

6.3 Ground Water Sample Collection and Compositing

The following procedures will be employed in collecting ground water samples from the shallow ground water aquifer, present from about 2 feet to about 12 feet below the ground surface.

- Water level measurements will be taken to the nearest 0.01 foot with respect to the established survey point, using an electronic water level indicator.

- Total depth of the well will be measured and recorded prior to purging using a weighted steel measuring tape.

- Wells will be purged using a Fultz stainless steel and teflon pump. The wells will be purged until a minimum of three well volumes of water have been displaced and the pH, temperature, specific conductance, color and odor of the discharge have stabilized using the following criteria: pH to ± 0.1 unit, temperature to $\pm 0.5°C$, and specific conductance to ± 10 umhos.

- Water samples will be composited using the same Fultz pump. Twenty-five (25) gallons of water will be pumped from each well into a 55-gallon steel drum to form a composite water sample of fifty (50) gallons total volume. Care will be taken to minimize agitation of the water to avoid the loss of volatile organic constituents.

- The drum will be sealed or covered to minimize volatilization.

- Ground water samples of a size suitable for shipment to the individual treatability vendors will be withdrawn from the drum by siphoning using Teflon tubing. The ground water treatability contractor will be sent the volumes for testing given in Table 6. In addition, the analytical sample for conventional parameters (approximately 10 gallons) will be sent to:

  Lancaster Laboratories
  2425 New Holland Pike
  Lancaster, Pennsylvania 17601

  Each solidification contractor will be sent 5 gallons of ground water.

- All shipping containers will be placed in coolers or protective packaging and will be cooled to 4°F using ice packs.

6.4 Decontamination Procedures

To minimize the potential for cross-contamination between samples, all sampling equipment (hand augers, shovels, and trowels) will be decontaminated according to the following procedures outlined by Dames and Moore in the "Final Project

Operations Plan" dated 4 March 1987, and previously approved by EPA Region II.

1. Wash with a low phosphate detergent.

2. Tap water rinse.

3. Rinse with 10 percent nitric acid solution.

4. Tap water rinse.

5. Methanol followed by hexane rinse.

6. Deionized water rinse.

7. Air dry.

The steel compositing container will be steam-cleaned between preparation of each individual composite.

Due to the expected difficulty in accessing certain portions of the site for sampling, it may be necessary to obtain individual hot spot samples of soil and pit sludge using a backhoe. Samples will be obtained from the desired depth interval directly from the backhoe bucket.

Backhoe equipment will be decontaminated prior to use, between sample locations, and at the completion of sampling activities. A manual scrubbing to remove foreign material followed by a thorough steam-cleaning will be used for decontamination of the backhoe. Decontamination of the backhoe will take place at the on-site decontamination area which uses a buried 55-gallon drum as a sump for collecting decontamination fluids, i.e., water from the steam cleaner. Decontamination fluids will be pumped out of the drum, placed in new drums, and shipped off site for disposal.

All ground water sampling and water level measurement equipment will be decontaminated between sampling locations. A separate intake hose for the Fultz pump will be dedicated to each well, and the pump will be purged with deionized water between sampling locations.

7.0 Quality Assurance/Quality Control (QA/QC)

7.1 QA/QC Samples

The purpose of Quality Assurance samples is to determine how accurate or precise the sampling and analysis has been in characterizing or quantifying contamination in a sample. For those soil samples being submitted for laboratory analysis, Quality Assurance/Quality Control samples will be collected. Each Quality Assurance/Quality Control sample type is described below.

Duplicate samples - For each type of sample (ground water, soil, sludge, etc.), one (1) sample will be collected for duplicate analysis for every twenty (20) samples collected. If less than twenty (20) samples are to be collected in a particular medium, one (1) sample is still to be collected as a duplicate for each set or round of sampling.

Trip Blank - Each trip blank will be prepared by the laboratory. Sterilized sand will be used for the trip blank for soil sampling, and organic-free deionized water will be used for the trip blank for ground water sampling. The trip blank consists of a set of sample containers filled with laboratory demonstrated analyte-free water or sand. The containers remain sealed at all times and accompany the sample bottles from the laboratory to the site and back to the laboratory. This blank will evaluate the sample container preparation procedures. One set of trip blanks will be required for each set of containers per matrix returned to the laboratory. For example, if sample containers for two days' sampling are received on one day, but the samples are returned to the laboratory at two different times, two sets of trip blanks will be used. Trip blanks will be analyzed for priority pollutant volatile organic compounds.

7.2 Sample Preparation, Storage and ERM Custody Procedures

The primary objective of sample custody procedures is to create an accurate written record which can be used to trace the possession and handling of all samples from the moment of their collection, through analysis, until their final disposition. Sample custody for samples collected will be maintained by the ERM Site Operations Manager or the field personnel collecting the samples. The Site Operations Manager or field personnel are responsible for documenting each sample transfer, and maintaining custody of all samples until they are shipped to the treatability contractors.

Chain of custody will begin with sample container preparation, inspection, and labeling at the ERM secure sample container facility. Sample containers from the ERM sample container facility will be signed over to the Site Operations Manager by the Container Custodian. Sample bottles needed for a specific sampling location will then be relinquished by the Site Operations Manager to the field sampling team after the Site Operations Manager has verified the integrity of the sample containers, and assured that the proper bottles have been properly assigned to the task to be conducted. The chain of custody will be maintained through transport of the containers to the site, the sampling, and delivery to the treatability contractor. The chain of custody form will be signed by both the relinquishing and receiving parties each time the sample changes hands, and the reason for transfer will be indicated.

A self-adhesive sample label will be affixed to each container before sample collection to minimize label loss during handling of the container. The following information will be written on the label:

1. Client identification,

2. ERM Traffic Report Number,

3. Sample name, as specified in this Sampling Plan,

4. Date and time collected,

5. Sampler's initials,

6. Type of treatability testing requested, as specified in this Sampling Plan, and

7. Sample preservation method (i.e., cooling).

Immediately after sample collection and preparation, each sample container will be sealed. Analytical samples will be placed into an insulated cooler for shipment to the individual treatability contractors. ERM field chain of custody records (Figure 2) and an ERM traffic report (Figure 3), completed at the time of sample collection, will accompany the samples inside the cooler for shipment to the treatability contractor. The samples will be properly relinquished on the field chain of custody record by the sampling team. These records will be sealed inside a ziplock plastic bag to protect them against moisture. Each cooler will contain ice packs to ensure that the proper temperature (4°C) is maintained, and will be packed in a manner to prevent damage to sample containers. The Site Operations Manager will then initial and custody seal (Figure 4) each sample cooler. All coolers will be shipped by an overnight courier according to current US DOT regulations. Prior to releasing the coolers, the Site Operations Manager will require the courier to sign an ERM cooler transfer acknowledgment (Figure 5).

Upon receiving the samples, the treatability or analytical contractor's Sample Custodian will inspect the condition of the samples, compare the information on the sample labels against the field chain of custody record and traffic reports. The contractor's Sample Custodian will note any damaged sample containers or discrepancies between labels and custody/traffic report forms when logging the samples and will note any discrepancies in Section 11 of the ERM traffic report. Where such discrepancies are noted, contact will be made with the Site Operations Manager or other designated ERM representative.

Proper action will then be taken to rectify the discrepancy, with accompanying documentation between the contractor and ERM.

FIGURE 2

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Sample Chain of Custody

W.O.No.:	Project Name:
Sampler:	

ERM Sample Number	Date	Time	COMP	GRAB	Station Location	Number of Containers							Remarks

Sample Relinquished by:	Date	Time	Sample Received by:	Date	Time	Reason for Transfer

COPIES White & Yellow copies accompany sample shipment to laboratory Yellow copy returned by laboratory White copy to be returned to ERM for files Pink copy retained by sampler Gold copy extra copy as needed (warehouse)

FIGURE 3

The ERM Group

Traffic Report

1 Project W.O.	2 Sample Concentration	6425
Project Name/Location	☐ Low Concentration	
	☐ Medium Concentration	3 Ship to:
	5 Sampling Personnel Contact	
4 Sample Matrix	Sampler:	
☐ Liquid ☐ Solid	Project Manager	
☐ Other	Phone No. (215) 524-3500	Attn:

6 Shipping Information
(Name of Carrier)
(Date Shipped)
(Airbill Number)
8 Sample Location
Date:
Time:

7 Specify Type of Analyses, Number of Containers, Approx. Volume

Analyses / Method Requested	No. of Bottles	Total Volume

9 Sample Description	
☐ Surface Water	☐ Soil
☐ Ground Water	☐ Solid
☐ Leachate	☐ Other:
☐ Sediment	

10 Special Handling (e.g. Safety Procedures/Hazardous)

Additional comments: (Specify data package, rush work, special detection limits, etc.)

11 Condition of Samples Received (to be completed by Laboratory Log-in.)

- ☐ Samples received intact
- ☐ Samples at 4 degrees (C)
- ☐ Samples not leaking
- ☐ Container numbers match as specified in Item 7
- ☐ Container tags match Chain of Custody
- ☐ Cooler received with Custody Seals intact
- ☐ Samples contained within plastic bags

Log-In Person's Signature

____

Copies: White & Yellow copies accompany sample shipment to laboratory. Yellow copy retained by laboratory. White copy to be returned to ERM for files. Pink copy retained by sampler. Gold copy extra copy as needed (warehouse).

FIGURE 4

The ERM Group OFFICIAL CUSTODY SEAL	Name ______________ Date ______________

FIGURE 5

ERM COOLER TRANSFER ACKNOWLEDGEMENT

DATE / TIME	CLIENT / PROJECT / CLIENT NUMBER	NUMBER OF COOLERS	ERM RELEASE (SIGNATURE)	RECEIVED BY (SIGNATURE)	DATE / TIME